REMARKS

The application has been amended. The application is believed to be in condition for allowance.

Should the case not be considered in condition for allowance, an INTERVIEW prior to another Official Action is solicited.

Previously, responsive to the requirement for election of species, applicants elected Species 1, drawn to determining the position or orientation of a creature by recording relative positions of the received signals. It was believed that claims 1 and 5-42 read on the elected embodiment.

The Official Action now withdraws from consideration all claims other than claims 1, 5-12, and 23-42.

The elected species determines the position and/or orientation of a creature relative to an environment by repeatedly determining the position and/or orientation of the creature when the creature moves. In the method, a transducer repeatedly determines its position and/or orientation by receiving incident signals from signal sources in the environment. By such a method, the positions and/or orientations determined for the creature may be recorded for mapping of the movement of the creature relative to the environment and/or the relative movement, i.e., movement relative to the previous position and/or orientation of the creature.

Each of the withdrawn independent claims have been amended to more clearly read on the elected species. Accordingly, reconsideration and examination of the withdrawn claims are respectfully requested.

Formal Matters

Claims 1, 5-12, and 23-42 were rejected as indefinite.

As the claims have been amended to remedy the stated bases of rejection, withdrawal of the rejection is solicited.

Substantive Rejections

Claims 1, 5-11, 23-28, 30-35, and 37-42 stand rejected as obvious over HINES et al. 6,396,413 in view of LESTER 3,696,384.

Claims 12, 29, and 36 stand rejected as obvious over HINES and LESTER in view of STEINBRECHER 6,665,631.

A review of the invention may prove useful.

Figure 1 is reproduced below.

With reference to specification page 18, second full paragraph, room 1 represents an environment with some limiting surfaces (walls, floor) and containing a number of things 2, e.g., pictures. There is illustrated a visitor 3 provided with a device for determining his position and/or orientation relative to the room.

The device comprises a locating member 4 that includes a transducer 5 arranged to determine the transducer's position and/or orientation relative to the room.

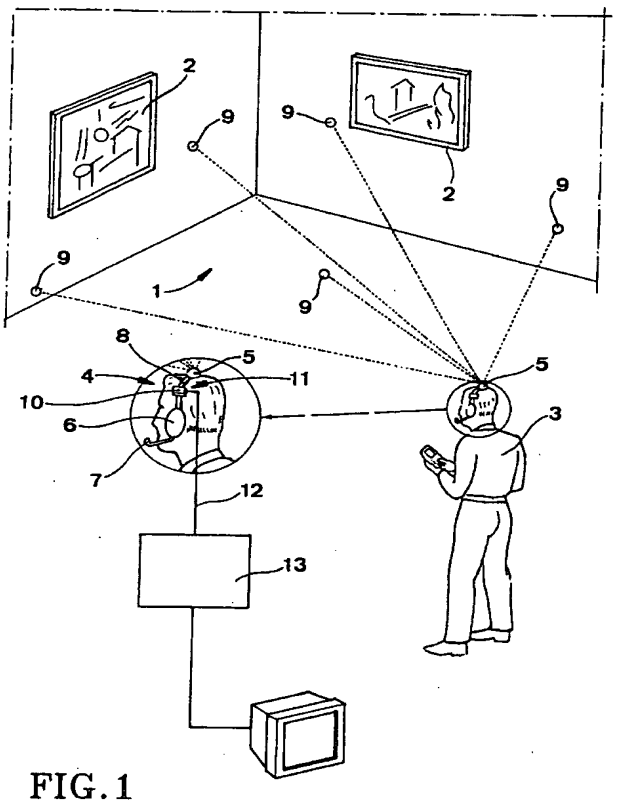


FIG. 1

The transducer 5 is arranged on the head of the visitor 3. Thus, one may determine the position of the person 3 relative to the room 1 as well as relative to separate objects 2 in the room 1. In addition, the transducer 5 enables determining of the orientation of the person 3.

By the transducer 5 being located on the head of the person 3, also information about how the head is turned relative to the environment is obtained. This "heading turning"

information indirectly gives information about the viewing direction of the person 3.

Also the locating member 4 includes earphones 6 and a microphone 7. Element 8 provides a means 8 by which the person 3 and the transducer 5 are connected so that the relative positions and orientations of the person 3 and the transducer 5 are arranged to be within a limited distance interval. Thus, by means of the information about the position and/or orientation of the transducer 5, the position and/or orientation of the person 3 may be determined.

Figure 1 also illustrates the transducer 5 arranged to receive incident signals from signal sources 9, for achieving the position- or orientation information of the transducer relative to the room. The transducer 5 repeatedly determines the transducer's position and/or orientation relative to the room when the transducer 5 and the room are moved relative to each other, i.e., when the person 3 moves within the room.

Next consider Figure 2, reproduced below.

There is illustrated known position parameters (x, y, z) in a known coordinate system, and orientation parameters (α, β, γ), through which, the transducer/visitor's relation to the room is known.

The transducer may determine its own position and/or orientation with respect to at least two degrees of freedom relative to the environment. In the example illustrated in

Figure 1, the position of the person 3 is suitably determined with respect to at least two position parameters for recording the position of the person 3 in a certain horizontal plane, for example where on the floor the person 3 is present, and with respect to at least one orientation parameter for recording the direction of the person 3 in the room (for example in which direction the head of the person 3 is directed or more closely how the head is turned about an axis perpendicular to the horizontal plane).

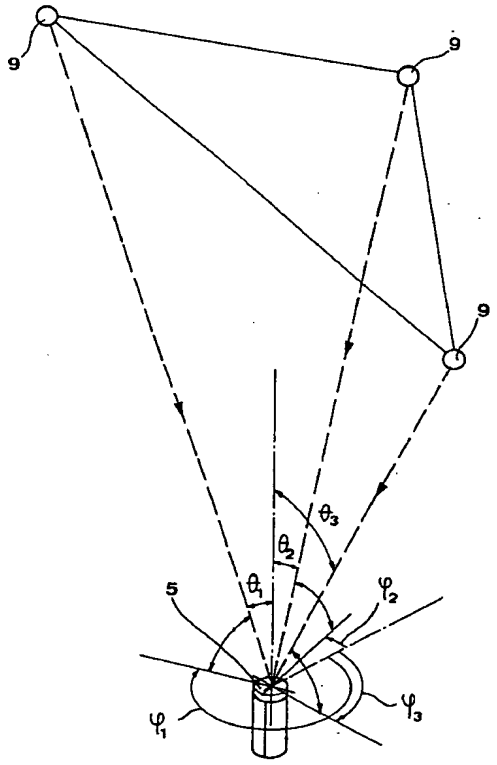


FIG.2

The transducer 5 may also determine in which horizontal plane the person 3 is present. The current horizontal plane may

vary, for example if the person 3 visits different floors or if the current person 3 bends down and straightens up.

With knowledge about a further orientation parameter, i.e., the head's rotation angle relative to an axis perpendicular to the horizontal plane, how the head of the person is leaned may also be determined.

Consider the recitations of claim 1. There is recited a first step of connecting a creature to a locating member (4) including a transducer (5), the creature and locating member being connected so that the relative positions and/or orientations of the creature and the transducer are known and within a limited interval. Thus, if the position and orientation of the transducer is determined, one can determine the position and orientation of the creature (visitor in the above example).

The claim next recites a step of operating the transducer to determine the transducer's position and/or orientation with respect to at least two degrees of freedom relative to the environment by the transducer. This step includes sub-parts.

The first sub-part is i) receiving incident optical signals from at least two signal sources (9) located in the environment and by recording the relative incident positions of the received signals on a surface of the transducer. Again, see Figures 1-2 above. The second sub-part is ii) calculating and using a direction of each sight line extending between each

respective signal source and the transducer to determine the transducer's position and/or orientation with respect to the at least two degrees of freedom relative to the environment.

The claim concludes by reciting to determine the position and/or orientation of the creature from the transducer's determined position and/or orientation.

Neither HINES nor LESTER teaches the recited inventive method. Nor do HINES and LESTER, together in any reasonable combination, teach the recited inventive method. Accordingly, the claims are all believed patentable.

The personal alarm monitor system according to HINES is a system which is completely different from the system recited in the claims and described in the present application. HINES teaches a method where the location of a person can be determined. This implies that it is possible to determine for example in which room in designated premises the person is located. HINES does not teach a method for determining the position and/or orientation of a creature in the method recited.

See amended claims 1 and 5-6. The position or the orientation of the person is not determined in terms of the translation coordinates (x, y, z) or angles of rotation (α, β, γ). In fact, the six spatial degrees of freedom of an object, three translations and three rotations, are not even discussed in the patent to HINES. In column 3, lines 55-58, HINES says: "The overall operation of the system, however, is intended to provide

general position information rather than pinpoint coordinates. Each defined area will have at least one gate-way tag."

In accordance with the present invention, the position and/or orientation of a transducer of a locating member (mechanically) connected to a creature is determined relative to the environment. This means the position and/or orientation of the transducer is determined according to the method. Thereafter, the position and/or orientation of the creature can be determined by means of the position and/or orientation of the transducer since they are mechanically connected to each other.

On the contrary, the "locating member" 20 of HINES only receives an identification code by means of transmitted radio signals so as to obtain a "YES" (the person is in the current room) or a " NO" (the person is not in the current room). Thus, there is no transducer for which the position and/or orientation is determined. According to HINES, only proximity to a certain transmitter is determined. This is to say, the only information obtained is that the receiver is within (or is not within) the distance covered by the transmitter. Since the person carries the receiver, the person must also be within a distance from the transmitter covered by the transmitter.

The position of the person, however, is not known because the position can be any position along a spherically surface defined by a radius equal to the distance between the transmitter and the receiver. Neither the distance is known,

since there is no distance measurement performed. Furthermore, the orientation of the person is certainly not determined by such a system.

According to the present invention, the position and/or orientation of a transducer is determined with respect to at least two degrees of freedom relative to the environment by receiving incident optical signals from at least two signal sources in the environment and by recording the relative incident positions of the received signals on a surface of the transducer, and by calculating and using the direction (φ_1, θ_1) of each sight line extending between respective signal source and the transducer.

HINES says nothing about optical signals.

HINES says nothing about recording the relative incident position of the received signals on a surface of the transducer.

The Official Action has made reference to column 3, lines 59-67, discussing "recording the incident position of the received signals". However, in the recited part, RFID tags broadcasting a unique identification code are described. HINES says nothing about determination of the position and/or orientation of a transducer by recording the relative incident positions of the received signals on a surface of the transducer. Please note that the positions are the positions where the incident signals hit the transducer.

HINES says nothing about determination of the position and/or orientation of a transducer by calculating and using the direction (φ_1, θ_1) of each sight line extending between respective signal source and the transducer.

Accordingly, applicants respectfully submit that there is a fundamental difference between the recited method of the invention and the prior art cited by the Examiner.

LESTER discloses an ultrasonic tracking and locating system in which an identification code number is used to activate an encoder. A transducer transmits a coded, ultrasonic digital signal which is dispersed throughout the room. Portable pocket unit transceivers carried by persons to be located receive the transmitted ultrasonic signals and decode the signals to determine if they correspond to the pocket unit's identification code. This system is basically of the same type as the system disclosed in HINES; that is to say, the system uses an identification code for tracking and locating a person in a building.

Please note that the term "transducer" in LESTER is used to define a means for transmitting ultrasonic signals. The term "transceiver" defines a means for receiving or transmitting signals.

In the present application, however, the "transducer" does not broadcast any signals but is used to receive and record signals from signal sources in the environment which signals

incident on the transducer. By receiving incident optical signals from at least two signal sources and by recording the relative incident positions of the received signals on a surface of the transducer, and by calculating and using the direction (φ_1, θ_1) of each sight line extending between respective signal source and the transducer, the position and/or orientation of the transducer can be determined.

The references made by the Official Action cannot be followed. In fact, LESTER says nothing about a transducer as described in the present application and nothing about optical signals. For example, column 5, lines 20-28, cited by the Official Action, different types of transducers capable of generating ultrasonic waves are discussed. But there is no teaching or suggestion of using an optical arrangement.

Further, in LESTER, there is no indication at all that points in the direction towards the invention which uses the directions of the sight lines between the signal sources and the transducer for determining the position and/or orientation of the transducer, and thereafter determines the position and/or orientation of the creature.

Indeed, a combination of the teachings of HINES and LESTER would not lead to the invention as recited. Such a locating system would still be based on the use of an identification code where the radio signals (taught by HINES) are replaced by ultrasonic signals (taught by LESTER). The position

and/or orientation of the person are not determined, but the presence of the person in a certain room or proximity to a certain transmitter is detected. In any case, such a locating system would not use the method according to the invention for determination of the position and/or orientation of a creature.

Furthermore, see the recitations concerning (claim 6) direct angular measurements of the incident signals. Thereby, it is possible to determine the position and/or orientation of the transducer with a very great accuracy. In some cases, the determination can be accomplished with accuracy in the magnitude of 1/10 of a millimeter with respect to the position and 1/10 of a mrad with respect to the orientation.

In summary, neither HINES nor LESTER teaches the recited inventive method. Nor do HINES and LESTER, together in any reasonable combination, teach the recited inventive method. Accordingly, the claims are all believed patentable.

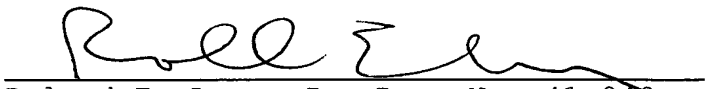
Reconsideration and allowance of all the claims are therefore respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any

overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

YOUNG & THOMPSON



Roland E. Long, Jr. Reg. No. 41,949
745 South 23rd Street
Arlington, VA 22202
Telephone (703) 521-2297
Telefax (703) 685-0573
(703) 979-4709

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